

Translation

PATENT COOPERATION TREATY

PCT/EP2000/010164



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 5695	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2000/010164	International filing date (day/month/year) 16 October 2000 (16.10.2000)	Priority date (day/month/year) 15 October 1999 (15.10.1999)
International Patent Classification (IPC) or national classification and IPC G01F 23/26		
Applicant SIE SENSORIK INDUSTRIE-ELEKTRONIK GMBH		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of <u>7</u> sheets, including this cover sheet.  <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  These annexes consist of a total of <u>6</u> sheets.
3. This report contains indications relating to the following items:  I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 30 April 2001 (30.04.2001)	Date of completion of this report 13 February 2002 (13.02.2002)
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# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2000/010164

## I. Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

- ☐ the international application as originally filed.
- ☒ the description, pages 1-17, as originally filed,  
 pages \_\_\_\_\_, filed with the demand,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☒ the claims, Nos. \_\_\_\_\_, as originally filed,  
 Nos. \_\_\_\_\_, as amended under Article 19,  
 Nos. \_\_\_\_\_, filed with the demand,  
 Nos. 1-13, filed with the letter of Fax of 7 February 2002 (Fax of 7.02.2002),  
 Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☒ the drawings, sheets/fig 1/3-3/3, as originally filed,  
 sheets/fig \_\_\_\_\_, filed with the demand,  
 sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

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## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Claims	1-13	YES
	Claims		NO
Inventive step (IS)	Claims	1-13	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-13	YES
	Claims		NO

### 2. Citations and explanations

#### 1.

Reference is made to the following documents:

- D1: TOTH F N ET AL: 'A PLANAR CAPACITIVE PRECISION GAUGE FOR LIQUID-LEVEL AND LEAKAGE DETECTION' IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT, US, IEEE INC. NEW YORK, Vol. 46, No. 2, 1 April 1997 (1997-04-01), pages 644-646, XP000197702 ISSN: 0018-9456
- D2: US-A-5 722 290 (KRONBERG JAMES W) 3 March 1998 (1998-03-03)
- D3: US-A-5 532 527 (ZATLER ANDREJ ET AL) 2 July 1996 (1996-07-02)
- D4: US-A-5 739 598 (EFERL FRANC ET AL) 14 April 1998 (1998-04-14)
- D5: DD-A-221 549 (AMMENDORFER PLASTWERK VEB) 24 April 1985 (1985-04-24), cited in the application
- D6: DE-A-42 17 305 (EFERL FRANC; ZATLER ANDREJ (SI)) 2 December 1993 (1993-12-02), cited in the application

2.

Insofar as it can be understood with the help of the description (in particular Figures 2 and 5), the subject matter of Claim 1 and Claim 12 meets the novelty and inventive step requirements of PCT Article 33:

The application concerns the detection of the filling level of a medium in a container with a non-metallic wall. Claim 1 defines a capacitive sensor, consisting of electrodes attached to the container wall and a detection circuit. The circuit comprises an amplifier (oscillator) which is controlled by charging capacitances, whereby the amplifier is capable of detecting a given level of the medium in the container.

The closest prior art is considered to be represented by D1 which discloses a capacitive sensor likewise corresponding to the abovementioned features.

The subject matter of Claim 1 differs from D1 by a particular arrangement of the electrodes and their connection to the amplifier; said electrodes enable the capacitive influence of the container to be countered by appropriate amplifier feedback. In this way, the filling level should be detected more precisely.

Although parasitic capacitances are suppressed in D1 by the use of an oscillator, these capacitances arise from the (long) connection cables to the detection circuit, not from the capacitive properties of the container.

The capacitive properties of the container do not appear to play an essential role in the electrode arrangement according to D1, since that document does not mention

them.

Therefore Claim 1 defines an alternative sensor which is not rendered obvious by D1.

The other search report citations, D2 to D6, mention only measuring sensors which are intended to be immersed in a medium to be measured. Consequently the subject matter of Claim 1 is not suggested by these documents either.

When interpreted with the help of the description, the subject matter of Claim 1 is thus considered novel and inventive (PCT Article 33(2) and (3)).

Claim 12, likewise when interpreted on the basis of the description, concerns a special embodiment of a sensor according to Claim 1, in which the electrode arrangement is further defined (cf. Figure 5). Therefore the subject matter of Claim 12 is likewise considered novel and inventive (PCT Article 33(2) and (3)).

3.

Claims 2 to 11 and 13 are dependent on Claims 1 and 12, respectively, and as such would likewise appear to meet the novelty and inventive step requirements of PCT Article 33.

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1.

Claims 1 and 12 do not meet the requirements of PCT Article 6:

Claim 12 can be interpreted to mean only that it defines a device as per Figure 5. In the light of the description, this device differs from the device as per Figure 2 only by a further characterization of the electrode arrangement; in other respects, the detection principle is the same. Consequently:

(a) the following essential features of Claim 12 concerning the amplifier in Claim 1 should have been included in this claim:

- (i) "with an amplification factor greater than one"; and
- (ii) "with an operating frequency between approximately 4 MHz and approximately 10 MHz";

(said features are essential for defining the invention: feature (i) means that the amplifier can be an oscillator; re feature (ii) cf. page 9, lines 9 to 18, of the description); and

(b) Claim 12 should thus have been drafted as a claim dependent on Claim 1, since the embodiment illustrated in Figure 2 is not covered by the current Claim 12, thus giving rise to uncertainty as to the subject matter for which protection is sought (PCT Article 6).

## VIII. Certain observations on the international application

2.

The description and the drawings show that the so-called "first" and "third" electrodes in Claim 1 coincide (cf. page 12, line 34, to page 13, line 7, and Figures 2 and 3, as well as page 14, lines 17-18, and Figure 5).

The embodiments described and illustrated in Figures 2, 3 and 5 are therefore not covered by the current Claim 1, whose wording ("it being possible for the first and the third electrodes to coincide") does not rule out the possibility of the "first", "second" and "third" electrodes defined in the claim being three different electrodes. This inconsistency between Claim 1 and the description give rise to uncertainty as to the subject matter for which protection is sought and hence Claim 1 is unclear (PCT Article 6).

Further objections under PCT Article 6:

**Claims 1 and 12:**

- The feature "a circuit which supplies a switching signal when the amplifier does not oscillate" contradicts the description (cf. page 13, lines 20 to 23 and 32 to 35).

- It is unclear whether the feature "which is connected to earth" refers to the sensor or the container. Furthermore the sensor is only capacitively coupled to earth (cf. Figures 2, 3 and 5).

**Claim 1:**

- With the current wording of the claim, the total number of electrodes attached to the container wall is not restricted. Therefore, in the light of Figures 2, 3 and 5,

## VIII. Certain observations on the international application

the scope of the claim goes beyond that justified by the description and drawings (PCT Article 6).

- Furthermore, Figures 2 and 3 show that the capacitance between the abovementioned electrodes is essentially influenced only by the capacitive properties of the container wall when the level of the medium in the container is below a certain threshold. Therefore the intended restrictions are not clear from the claim (PCT Article 6).

**Claim 12:**

- The claim does not specify that the electrodes are attached to the container wall; therefore the scope of the claim goes beyond that justified by the description and the drawings.

- A "second combined electrode" and a "third combined electrode" are defined although no "first combined electrode" has been defined.

- The embodiment shown in Figure 7 is not covered by the current independent Claim 12 which defines an "annularly recessed" plate which "concentrically surrounds" a combined electrode.

**Claim 11:**

- The dependency of Claim 11 has not been amended.